

2007 GSA Denver Annual Meeting (28–31 October 2007)
Paper No. 190–12

Presentation Time: 11:20 AM–11:35 AM

**IMPACT OF CLIMATIC CHANGE ON AN ARID WATERSHED: NAHAL
Yael, ISRAEL: EVALUATING BULL AND SCHICK'S 1979 MODEL WITH
NEW FIELD DATA AND IRSL AGES FROM NAHAL Yael**

ENZEL, Yehouda¹, AMIT, Rivka², LEKACH, Judith³, PORAT, Naomi², GRODEK, Tamir³, BIERMAN, Paul⁴, and EREL, Yigal¹, (1) Institute of Earth Sciences, Hebrew University, Givat Ram, Jerusalem, 91904, Israel, yenzel@vms.huji.ac.il, (2) Geological Survey of Israel, 30 Malkhe Israel St, Jerusalem, 95501, Israel, (3) Geography, Hebrew University, Jerusalem, 91905, Israel, (4) Department of Geology, University of Vermont, Delehanty Hall, 180 Colchester Ave, Burlington, VT 05405

Bull & Schick proposed in 1979 a model for the hyperarid (25 mm yr⁻¹) hyperthermic (mean annual T > 22 °C) Nahal Yael that since has been used in explaining geomorphic response to the Pleistocene–Holocene climate change in many semi- to hyper-arid watersheds. With acknowledging complexities resulting from diverse slope lithologies, they suggested that the change from semiarid late Pleistocene to the arid Holocene reduced vegetation cover and increased sediment yield from slopes that formed the observed terraces and alluvial fans. Later in the Holocene (Bull, 1991) these terraces and alluvial fans were incised. The climate change scenario was based on the then best paleoclimate knowledge. New data allows the evaluation of this extensively used model. These data indicate that: (a) the regional climate was hyperarid also during the late Pleistocene (Amit et al., 2006) and not transitional from semiarid to hyperarid (note: even 3 times modern annual rainfall is still hyperarid), (b) salic-gypsic Reg soils developed on flat late Pleistocene alluvial surfaces, (c) the calcic and argillic soil horizons previously reported are fluvio-pedogenic units that form beneath active hyperarid channels; they are not surficial soils forming under wetter climate but form in present-day channels (Lekach et al., 1998; Amit et al., 2007), (d) sediment stripping from slopes occurred during the late Pleistocene following a more intense chemical and physical weathering on granite slopes; modern channel delivers sediments from Pleistocene terraces and colluvia (Clapp et al., 2000), and (d) the IRSL ages of terraces and alluvial fan indicate fast removal of sediments from slopes between 50–18 ka rather than the early Holocene. The incision of the current channel is probably a latest Pleistocene and/or earliest Holocene phenomenon. The chain of events proposed by Bull & Schick may still hold and perhaps the temporal scheme is still applicable to the SW United

States where it is heavily used. However, our new data suggest a different scenario for the site where the model was first proposed. The Pleistocene–Holocene climate change was much weaker and its impact on Nahal Yael sediment yield is not observed. Minor variations within the slightly wetter but still hyperarid (and cooler?) environment may be responsible for the observed geomorphic changes.

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General Information for this Meeting

Session No. 190

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Colorado Convention Center: 407

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